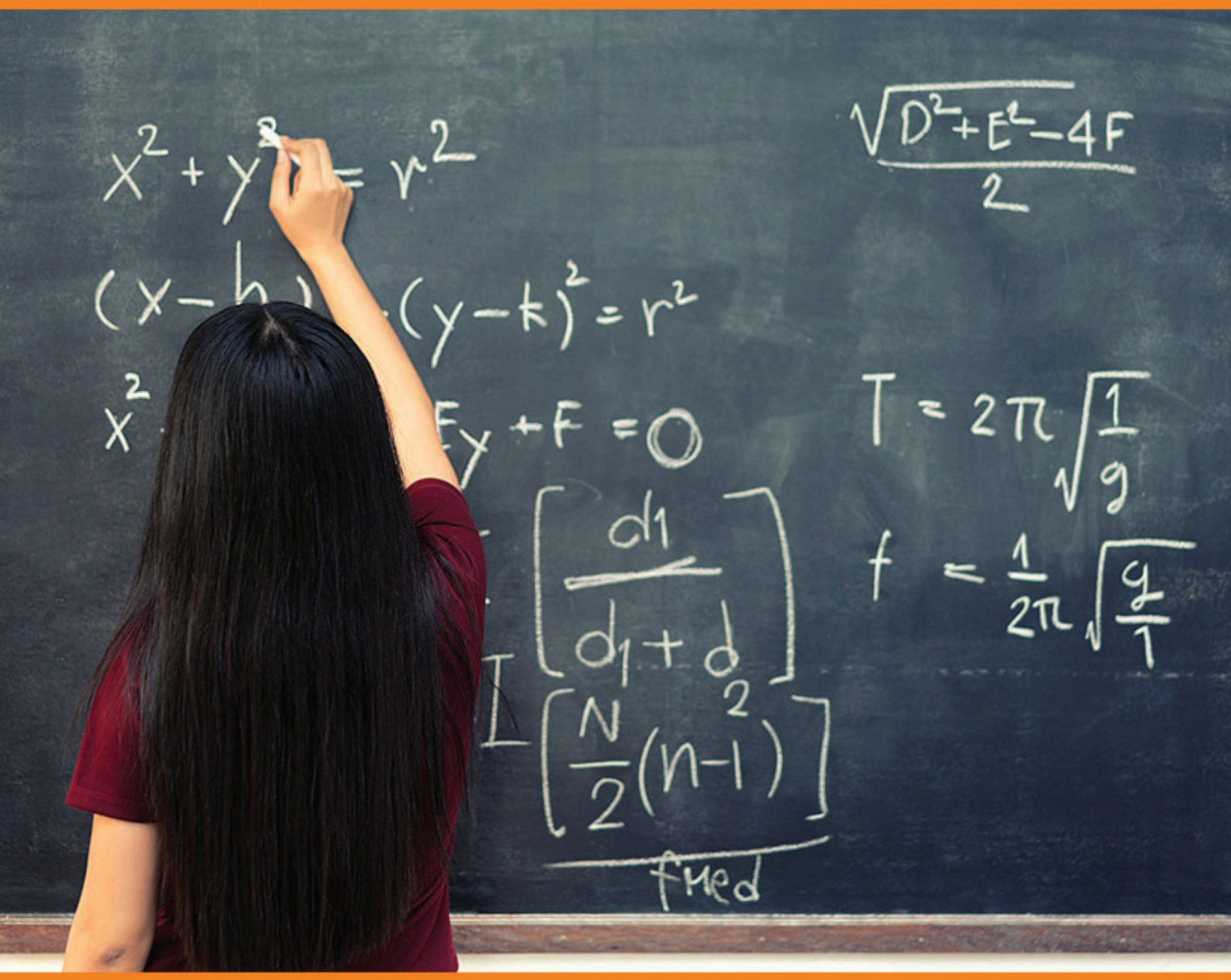
How to Inspire your students to be mathematicians



Explorelearning®

Inspiring students to become mathematicians

If you ask a class of students "who loves math," you rarely get a positive response. Why? Much has been made of "fixed"versus "growth" mindsets, and "I can't do/don't understand math" is one of the most common examples of a fixed mindset. Whether it's from unpleasant educational experiences, lack of confidence or encouragement, or something deeply ingrained ("girls can't do math"), overcoming that mindset can be challenging for both students and teachers.

The necessity in overcoming that mindset, wherever it comes from, is very real. To meet the nation's STEM goals we need to get students interested in math—interested enough to consider a career in mathematics. So how can you do that?

One way is to ground math in the "real world," by making the connection between the math they learn in school and the math that's all around us.

And it is all around us

2+2=4. Yes, it does, whether we're talking apples, dollars, or just some ephemeral notions called "two" and "four."

Showing students real-life math applications can help them appreciate how prevalent math is in our lives, and how, whether they know it or not, they already use it daily. It also impresses upon them the need to have at least a basic understanding of mathematics, no matter what paths their lives take. Show kids that without math you can't buy a new phone, run a 5k, build a shelf, or bake a cake.

Help students understand that spatial relationships are math as well. Studies have shown that learning to identify shapes and working with puzzles increase spatial understanding and achievement in math, especially geometry—and has recently been shown to increase growth in number line knowledge.

There is even "mathematics" in music. Counting, rhythm, scales, intervals … all utilize the "logic" of mathematics. The American Mathematical Society has significant resources that elaborate on the connections between music andmathematics. Many mathematicians have also been accomplished musicians, and vice versa. Einstein played the violin and piano, while Brian May from the rock band Queen studied math and physics, and has a Ph.D. in astrophysics. The "Garfunkel" half of Simon and Garfunkel, Art, has a Master's in mathematics.

Despite being born to poor, illiterate parents who were not even able to write down the date of his birth, Carl Gauss made enormous contributions to the fields of number theory, algebra, statistics, differential geometry, astronomy, and more. When he was eight, he figured out how to add up all the numbers from 1 to 100 (there's a fun game right there), and made the first of his ground-breaking mathematical discoveries when he was still a teenager.

Show movies like "Hidden Figures" and "October Sky," and discuss music and historical figures like Gauss to show that math isn't just the purview of middle-aged men laboring away in stodgy offices and to show what effect math has on all of our lives.

Use games and simulations to build interest and excitement in mathematics

Current practice suggests stepping away from endorsing rote memorization in math, or showing students "tricks" to come to a correct answer. By presenting math as creative and intellectually interesting, you can show your students a different way of looking it.

Games and simulations can demonstrate the elegance in math's patterns and conclusions and help build students' excitement and confidence in math.

Designed to increase students' math fact fluency, ExploreLearning Reflex's games are fun, challenging, and rewarding. Math fact fluency is the quick and effortless recall of basic math facts. When students achieve automaticity with these facts, they can retrieve them from long-term memory without conscious effort or attention. With math fact fluency comes confidence, and with confidence comes the belief that one can do math and that maybe math is kind of, sort of, interesting, after all.

Fraction knowledge in grade 5 uniquely predicts students' mathematics achievement in high school. This is true even after controlling for other variables like general intellectual ability, proficiency with whole numbers, working memory, and family income and education levels.

This means that many students who struggle with fractions will go on to struggle in Algebra and in turn become less likely to progress to more advanced coursework. This effectively cuts them off from the many careers in which mathematical skills are important—including in those STEM fields we mentioned earlier.

ExploreLearning Frax uses the latest research-based instructional methods to create a better way to learn fractions. With Frax, students come to understand that fractions are numbers too. The fun challenges, personalized instruction, and motivating rewards help students build their skills and understanding—all while exploring the galaxy with fractions! Combining Reflex with Frax gives student the skills and confidence in math they need.

ExploreLearning Gizmos use an inquiry-based approach to learning, which is an effective way to build conceptual understanding. Gizmos allow students to "act like mathematicians" by predicting, experimenting, testing, and proving mathematical ideas and concepts. By enabling students to try and try again, Gizmos help curb the fear of being wrong, allowing students to find a solution to a mathematical challenge, rather than remember the correct answer.

By showing students that MATH isn't just some difficult subject you have to study in school—that it's all around us, providing beauty and symmetry, you can help them enjoy and appreciate it. And possibly make a career of it!

At ExploreLearning®, we believe all students can have success in math and science — and have fun along the way! Our award-winning online STEM teaching tool programs — Gizmos®, Reflex®, Frax® and Science4Us®— bring engaging and effective instructional strategies to K-12 classrooms around the world.